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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,909	11/02/2001	Ping Yuan	MUL-003	5064
21323	7590	11/05/2003	EXAMINER	
TESTA, HURWITZ & THIBEAULT, LLP HIGH STREET TOWER 125 HIGH STREET BOSTON, MA 02110			NGUYEN, DILINH P	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/002,909	YUAN, PING	
	Examiner	Art Unit	
	DiLinh Nguyen	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-7 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Objections*

Claims 1 and 6 are objected to because of the following informalities:

In lines 4-5 of claim 1, the limitation "the absorption layer" should be changed to –the absorption narrow bandgap layer–,

in line 1 of claim 6, the limitaion "the absorption layer" should be changed to –the absorption narrow bandgap layer–.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2 and 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Su et al. (U.S. Pat. 5610416).

Su et al. disclose a semiconductor device (figs. 2 and 3A-3C, column 4, lines 16 et seq.) comprising:

an absorption narrow bandgap layer 23/24 (InGaAs);

a layer 25 (InP) disposed substantially adjacent to the absorption narrow bandgap layer; wherein the layer 25 is formed of InP; therefore, it is inherently that the layer 25 has the function of the wide bandgap layer.

a first doped layer 27 having a first conductivity type (P-type) disposed substantially adjacent to the wide bandgap layer 25; and

a passivation region 36 disposed substantially adjacent to the wide bandgap layer 25 and the first doped layer 27.

- Regarding claim 2, Su et al. disclose a second doped layer 26 (N-type) disposed substantially adjacent to the absorption narrow bandgap layer.
- Regarding claim 5, Su et al. disclose the first doped layer comprises indium phosphide.
- Regarding claim 6, Su et al. disclose the absorption layer comprises indium gallium arsenide (column 4, line 61).
- Regarding claim 7, Su et al. disclose wherein the wide bandgap layer varies in thickness from an etching thickness  $t_1$  to a deposition thickness  $t_2$ .

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al. (U.S. Pat. 5610416) in view of AAPA (fig. 1).

Su et al. fail to disclose a third doped layer disposed substantially adjacent to the first doped layer.

AAPA (fig. 1) discloses a semiconductor device comprising: an InGaAs doped layer 64 disposed substantially adjacent to the doped layer 68 and adapted to form an ohmic contact with a substantially adjacent metalization layer 8. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Su et al. to form an ohmic contact with the adjacent metalization layer for the semiconductor device.

5. Claims 1-3 and 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (fig. 1) in view of Scholl (U.S. Pat. 4544938).

AAPA (fig. 1) discloses a semiconductor device comprising:

an absorption narrow bandgap layer 76;

a first doped layer 68 having a first conductivity type disposed substantially adjacent to the wide bandgap layer; and

a passivation region 32 disposed substantially adjacent to the first doped layer.

AAPA fails to disclose a wide bandgap layer disposed substantially adjacent to the absorption narrow bandgap layer.

Scholl discloses a semiconductor device comprising: a wide bandgap layer 15 (column 3, lines 38) disposed substantially adjacent to an absorption narrow bandgap layer Eg1 (column 1, line 44). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of AAPA to improve selectivity and response time in a heterojunction photodiode, as shown by Scholl.

- Regarding claim 2, AAPA and Scholl disclose a second doped layer 80/11 (N-type) disposed substantially adjacent to the absorption narrow bandgap layer.
- Regarding claim 3, AAPA (fig. 1) discloses a third doped layer 64 disposed substantially adjacent to the first doped layer and adapted to form an ohmic contact with a substantially adjacent metalization layer.
- Regarding claim 5, AAPA (fig. 1) discloses the first doped layer 68 comprises indium phosphide.
- Regarding claim 6, AAPA (fig. 1) disclose the absorption layer comprises indium gallium arsenide.

#### ***Allowable Subject Matter***

Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (703) 305-6983. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DLN  
October 24, 2003

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